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PACIFIC NORTHWEST FOREST AND RANGE  
EXPERIMENT STATION  
PORTLAND, OREGON

RS - NW  
FIRE  
Effects

March 31, 1942

HISTORIC ACCOUNTS OF SMOKE THAT IMPEDED  
WATER AND AIR NAVIGATION

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During several years in the past smoke from forest fires has been so dense in Oregon and Washington that navigation along the coast and on the rivers has been impeded or halted.

In 1857 the Portland Oregonian of August 1 stated: ". . . The smoke is so thick along the river that objects can be seen but a very short distance. These fires occur every summer along the Columbia and sometimes it is so thick as to greatly impede navigation, steam or other boats having had to lay by until it has cleared away. . ."

In 1863 there were many items in the newspapers of western Oregon and Washington about dense smoke. The Seattle Weekly Intelligencer of September 21 in describing the smoke around Bellingham Bay stated: "Capt. Cosgrove reports that the smoke was so thick in the bay that he had the utmost difficulty in reaching the wharf. . ."

The Olympia Transcript of September 19 stated: "The steamer Anderson was delayed several hours on her up trip on account of the density of a compound made of about 61% of smoke and 39% fog. . ." On October 3 in this paper one finds: "The Sound steamers have all, we believe, been aground at different times during the existence of the smoke and thick fogs. . . ." On October 10 an item reads: "Capt. Lawson, of the coast survey, has been unable to prosecute the usual surveys because of the smoke this summer." On October 17 another item states the schooner Alaska from Honolulu "lay off the Columbia Bar in the fog some 20 days." Then on October 24 the Transcript printed two significant statements: "Vessels

are lying up all along the Sound, waiting for clear weather, to get out." The second reads: "Rain at last.--The first rain came on Tuesday (20th), a fine little sprinkle lasting but a few moments. On Thursday evening and night it came down in good earnest. . . . clearing a great deal of smoke."

These and other news items from around Puget Sound indicate there was little or no fall rain until October 24 and very little wind. Fires evidently burned readily in the dry fuels, and in the absence of wind the smoke settled near the ground where it was reinforced by occasional fog.

In Oregon according to the Oregonian there were many communities where the dense smoke made lights necessary in midday and movements of ships along the rivers and in coastal ports was hampered. On September 1 we find: "Light House Wanted.—Capt. Turnbull, of the Fannie Troup says that if this smoky weather continues, there will soon be need for about 37 lighthouses or about that many fog-bells along the Willamette River, to enable the steamers to find their way up and down. In the morning, when the fog is superadded to smoke, the obstruction to the vision is almost total. We learn that the Cascade steamer was delayed nearly two hours by the fog and smoke yesterday morning." On September 4 an item reads: "The bark Falkenburg is detained outside the bar by dense smoke and fog, rendering the crossing dangerous. Landmarks cannot be seen." In the same issue another item states that the steamship George S. Wright arrived at Columbia Bar at 3 a.m. on September 1 but lay off in the fog and smoke until September 2. On September 7 an article concerning fires near Yaquina Bay states: "The steamer Pioneer was unable to navigate her way through the density of the smoke. Day and night are of equal darkness."

In September 1902 there was a period of dry and windy weather in which fires throughout western Oregon and western Washington spread beyond control and caused so much smoke that numerous cities and towns reported daytime darkness equal to that of night. The Oregonian news items show that on September 11 Astoria and St. Helens were thrown into complete darkness in the afternoon. On September 12 all outside labor was abandoned at Olympia and the schools were dismissed because of the darkness. On the same day Centralia reported darkness of midnight until 10 a.m. and Salem reported the sun hardly visible.

Smoke was carried some distance to sea by east and northeast winds during a period of a day or two and it became so thick that it interfered with navigation as recorded in the following items among the marine news of the Morning Oregonian:

September 13. "Smoke Stops Shipping - Thick Bank Prevents Vessels Reaching the Columbia - Large Fleet of Over-Sea and Coasting Craft Due. The pall of smoke that hangs over this part of the country has almost brought the shipping business to a stop. . . . The thick bank of smoke and fog that hangs over the mouth of the Columbia not only renders it difficult for vessels to pass out but makes it almost impossible for anything without steam power to come in. A number of ships are due, and it is expected that when the weather changes quite a fleet will reach port."

September 13. "Port Townsend, Wash. The steam tug Tacoma, returning this morning from a sealing trip, reports that the prevailing smoke is spreading a heavy mantle along the entire shore line and extending 40 miles out to sea. Northeast winds prevailing. . . . the entrance to the straits is entirely obscured. . . . As yet no marine accidents have been reported,

though prevailing conditions make navigation difficult and dangerous.\*

September 14. "Smoke Continues to Paralyze Shipping in the River. The steamship (Columbia) is still hard and fast a short distance above Tongue Point, where she ran aground during the dense smoke Friday (Sept. 12) but will doubtless be floated at high tide today. . . Deep sea shipping is practically paralyzed by the conditions. Vessels can neither go up or down the river. . . . When the cloud lifts, a goodly fleet is expected in from outside, as people who have come up from North Beach report that they could see 3 or 4 square-riggers beating about off the mouth of the Columbia, waiting for a favorable opportunity to enter port.\*

The wind inland shifted to westerly about September 12 and the smoke was reported carried as far east as Boise where it obscured the sun on September 14.

In 1929 there were numerous fires in September and the large Dole fire northeast of Vancouver, Washington caused a great amount of smoke which was carried to sea by an east wind. Other fires added to this sea-borne smoke and the Oregonian of September 16 has the following item on the marine news page: "Vessels Delayed by Smoke and Fog - Navigation Impeded Along Entire Coast - Ships Behind Schedule - Five Craft Held Up in Columbia River Because of Lack of Visibility. A dense mixture of smoke and fog has enveloped vessels proceeding up and down the coast, officers from 2 ships coming into port yesterday reported. 5 were held up in the Columbia on account of the banks of smoke settling down near Rainier and Longview. 'As soon as we left San Francisco we ran into this combination of fog and smoke', said Henrik Andreasen, 1st mate of the Admiral Benson which docked yesterday at noon, 4 hours behind schedule. 'I know it extended out for 20 miles.' . . The blanket was composed of considerably more smoke than

fog, according to 1st officer Andreesen. . . . The Pacific President, Furness line motorship . . . ran into smoke all of the way up on the trip to Victoria and Vancouver. Puget Sound was covered with the dense haze. . . . The ship was forced to go slow on the way up from St. Helens yesterday morning."

The smoke in the vicinity of Portland was so dense that it interfered with air travel as shown by the following article in the Oregonian on September 14: "Fires Handicap Airman - Curtiss Fliers Defer Departure on Account of Smoke. Departure of the 5 representatives of the Curtiss flying service who arrived here last Sunday on a 4,000-mile tour of the northwest was postponed yesterday on account of poor visibility. According to Harry C. Clairborne, in charge of the group, forest fire smoke made flying north impossible. Lieutenant E. H. Robison, one of the members of the party, flew to Vancouver, Washington, but was forced to return."

Another news item in the Oregonian, September 18, 1929, shows that the Dole fire interrupted train service along the north bank of the Columbia: "Train Service Resumed. Regular train service on the North Bank line of the Spokane, Portland and Seattle Railway had been resumed yesterday morning after all danger of fire along the route had been removed. . . . For a four-hour period Monday night, the S. P. & S. trains were routed over the U.P. for several miles out of Portland. . . ."

The Tillamook fire in 1933 created a huge cloud of smoke in the vicinity of the fire during a period of several days. The heat from the fire was sufficient to carry the smoke to great altitudes and one estimate

of the altitude of the smoke cloud on the day of fastest spread based on a photograph of the smoke and camera lens principles placed the top of the cloud at 32,000 feet. No authentic reports of the dense smoke at sea from this fire have been found by the writer but on August 25 automobiles on the Coast Highway in the vicinity of Tillamook found it necessary to use their headlights and the town of Tillamook was in complete darkness. At this time the atmosphere at Portland was fairly clear. The wind shifted from east to west on August 26 and by the afternoon of August 27 the smoke was thick at Portland. A news item from Hood River stated the smoke began drifting into the valley in the evening and the visibility was limited to a few hundred feet. Air transportation schedules at Portland were interrupted. According to an article in the Oregonian of August 28 the visibility observed by the Weather Bureau at the airport was only 1/5 mile on the afternoon of August 27, but during the night a light mist began to clear the smoke. The article also states: "United Air Lines' night plane from Seattle was canceled because of the bad visibility, canceling, as well, the northbound plane. Officials said the through plane from Seattle flew south without stopping, and planes for the east adhered to schedule."

"The afternoon plane from Medford yesterday flew at 5,000 feet to keep in the clear. The pilot said the unusual altitude was necessary even as far south as the southern Oregon city to get visibility."

Weather Bureau Records of Low Visibility  
Caused by Smoke at Different Airports

The following data were obtained from a summary of Weather Bureau records for the period 1934-38 showing the number of observations of visibility distance of 1 mile or less caused by smoke at different airports in western Oregon and Washington during September, October, and November, the months of most frequent occurrence:

Portland	211 observations
Eugene	203
Medford	31
Seattle	192
Tacoma	59
Chehalis	69

These are based on hourly observations and therefore 200 observations equals only 1.8 percent of the total number of observations in the 5-year period for these 3 months at a given station.

There were very few observations showing low visibility due to smoke in July and August. Smoke also causes considerable low visibility during the winter months at Seattle and Portland but this is undoubtedly industrial smoke.

When the visibility distance is one mile or less the Civil Aeronautics Authority requires that no plane shall land unless it is equipped for instrument landing and the pilot is licensed for instrument landing.

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